Tutorial
H-1000-5333-02-A

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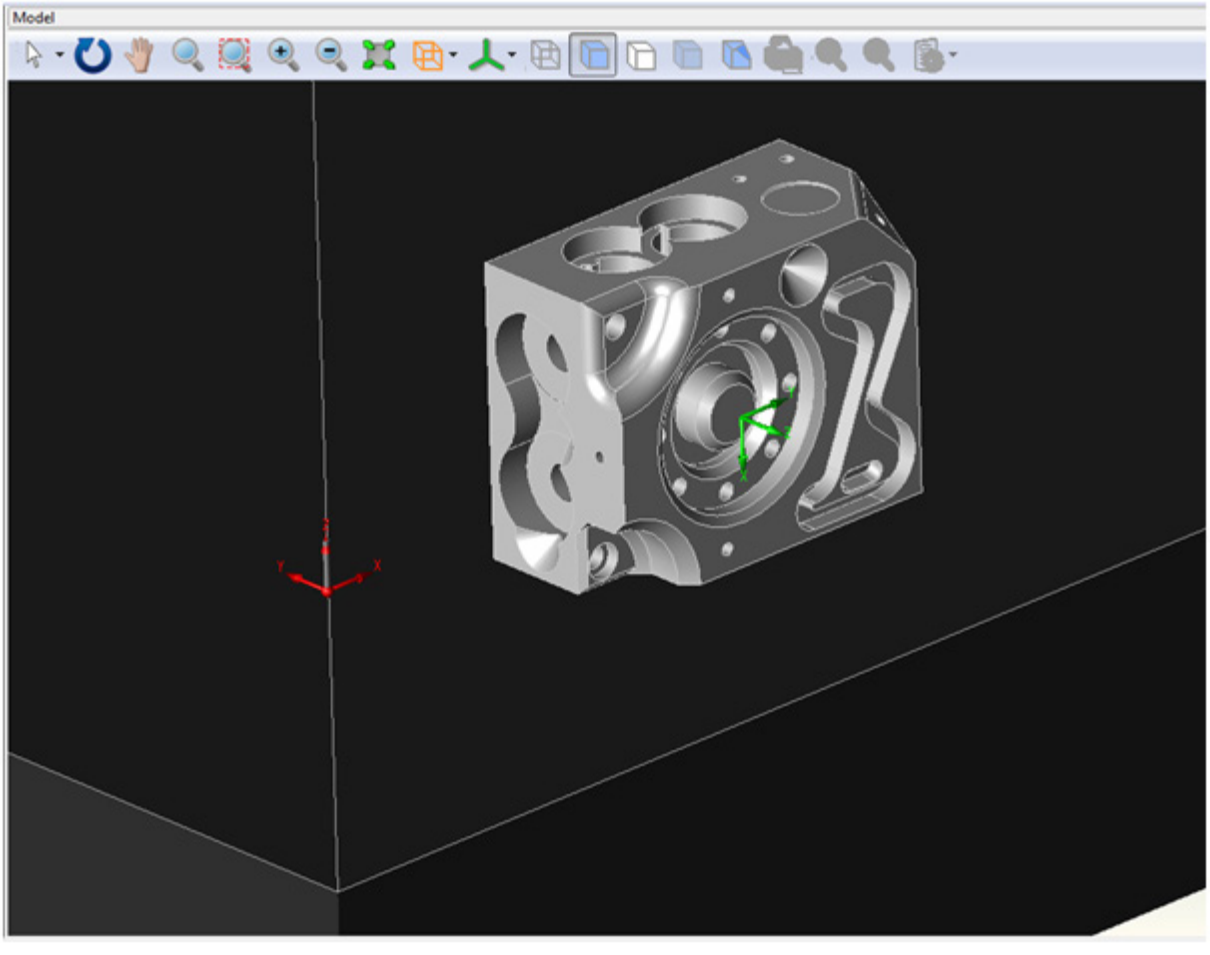
Work cell creation



Renishaw part no: H-1000-5333-02-A

Issued: 10 2015

Work cell creation

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1 Work cell creation

1.1 Tutorial pre-requisites

- The student should have completed all of the basic MODUS tutorials

1.2 Tutorial objectives

- Introduction to automated model manipulation and display when the desired model co-ordinates do not correspond to those of the machine
- Further exposure to model manipulation techniques

2 Introduction

The use of a work cell creation is required when:

- Programming OFFLINE when the CAD model component coordinate system is not orthogonal to the CMM machine coordinate system
- Or when working ONLINE and you wish to use point zero when using the CAD model component coordinate system not orthogonal to the machine

2.1 Benefits of using work cells

Pros

- When you import a new version of the CAD model into modus, a consistent orientation is maintained with no manual input making future maintenance of programming easier to manage
- Any point related .TXT files which have been imported by the customer client are all delivered in the correct coordinate system
- Any point files that we supply the customer are in the correct orientation to the original CAD model coordinate system

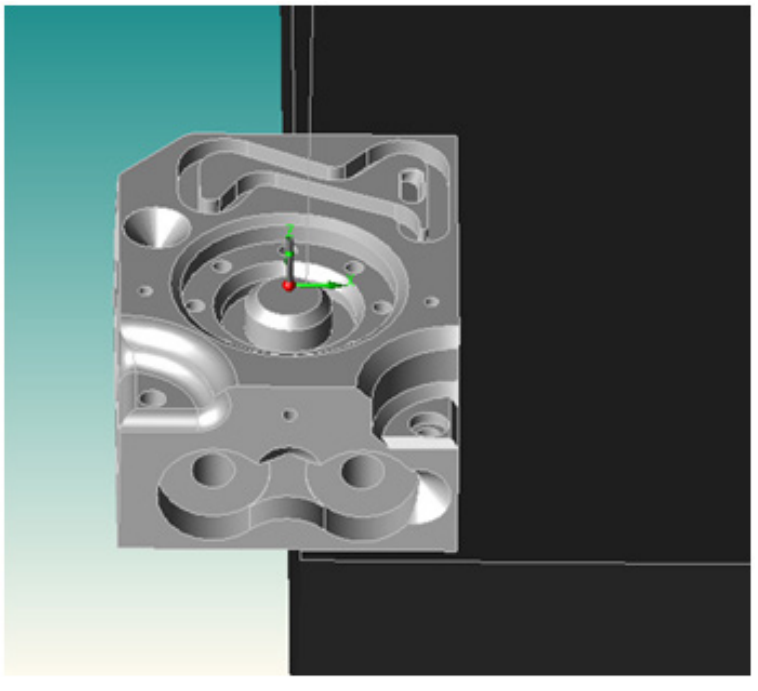
Cons

- Slightly more thought is required regarding the coordinate system of the part with respect to the coordinate system of the machine

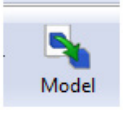
3 Work cell creation

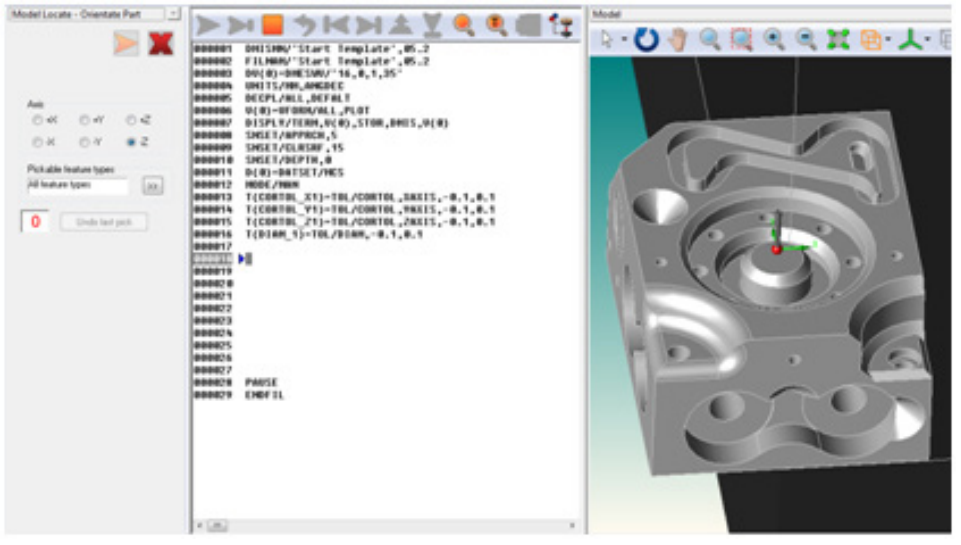
When you first import a CAD model into modus it is important to note that the model will be ‘snapped’ to machine coordinates.

NOTE: It is useful to turn on machine simulation as a graphical aid through ‘Model Explorer’.



Click ‘Model’ and then select ‘Locate’:



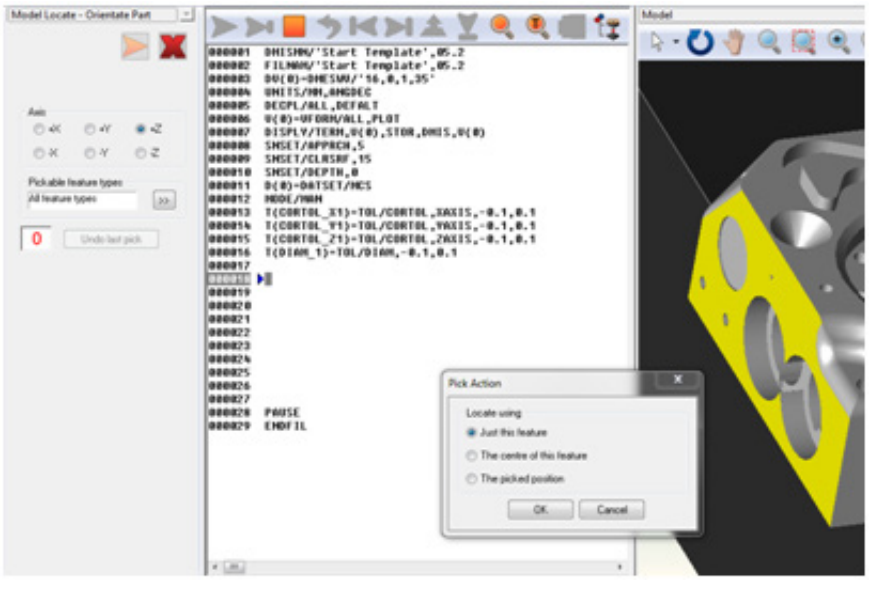


Now the CAD model can be located to the required orientation.

Select the feature you wish to orientate to the machine coordinate system by picking on the CAD model (in this case the plane) and select the axis (in this case z+).

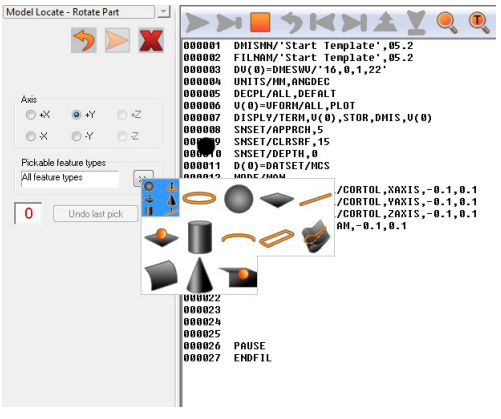
The example below uses the ‘Just this feature’ pick action. When this option is selected, the direction of the picked feature is aligned with the selected axis and used to transform the model. This option is only available if the picked feature defines both a position and a direction.

Click ‘OK’ in the ‘Pick Action’ dialogue box and then click on the ‘Play’ icon (orange arrow) to continue to the next stage.



Features now need to be picked to define the secondary orientation.

Select the feature to be orientated by picking on the CAD model. Feature types can be filtered in the ‘Pickable feature types’ selection pane as shown below.



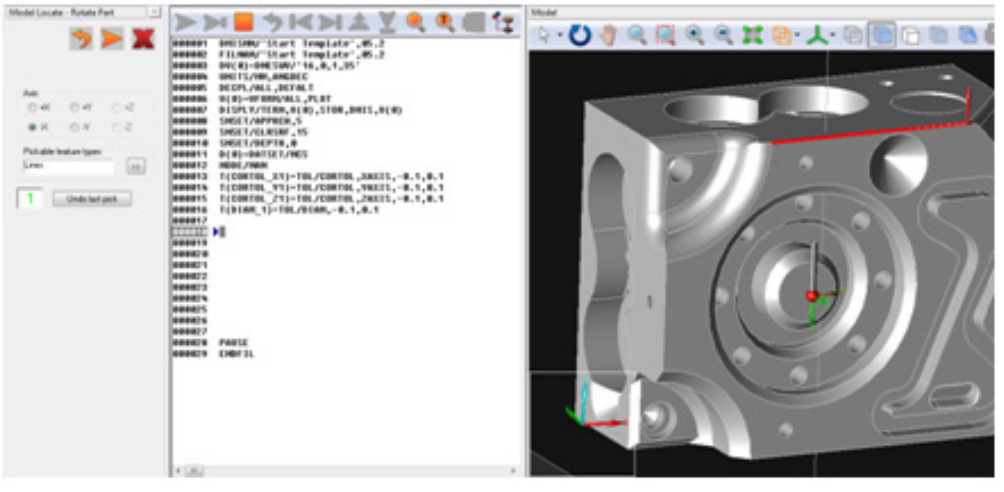
Select the required axis, using the model view as a graphical aid.

GUIDANCE NOTE: The ‘Pickable’ feature will appear as a blue cross until you click ‘OK’ in the ‘Pick Action’ dialogue box.

4 Secondary orientation methods

4.1 Method 1 - Secondary orientation using a line

In the example below the line is used to orientate the model to the X- of the machine coordinate system.

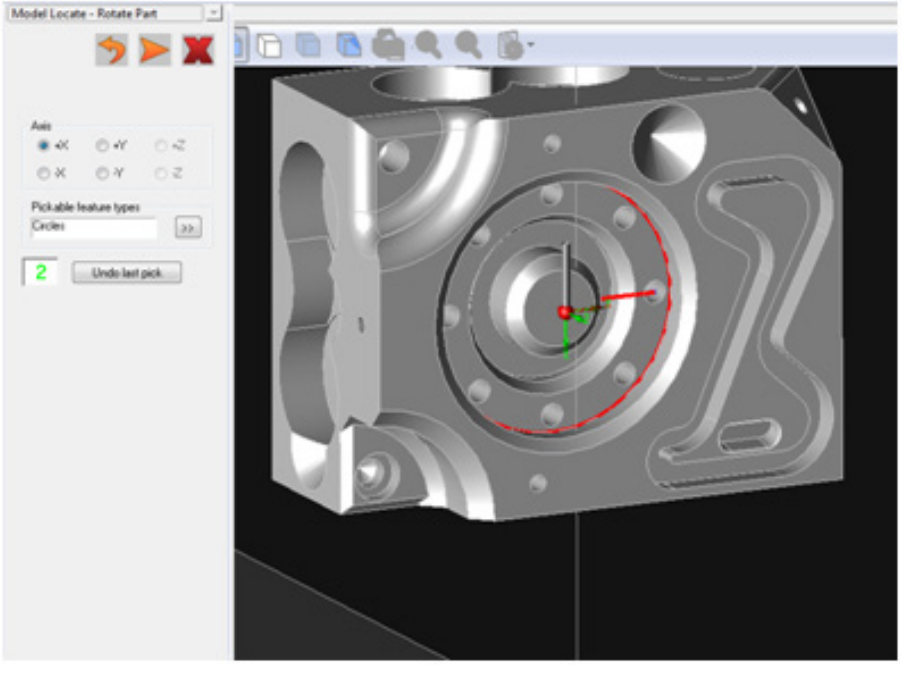


When pickable lines are not available, more than one feature (i.e. two circles) can be selected to create a line as shown below.

4.2 Method 2 - Secondary orientation using two circles

When pickable lines are not available, more than one feature (i.e. two circles) can be selected to create a line as shown below.

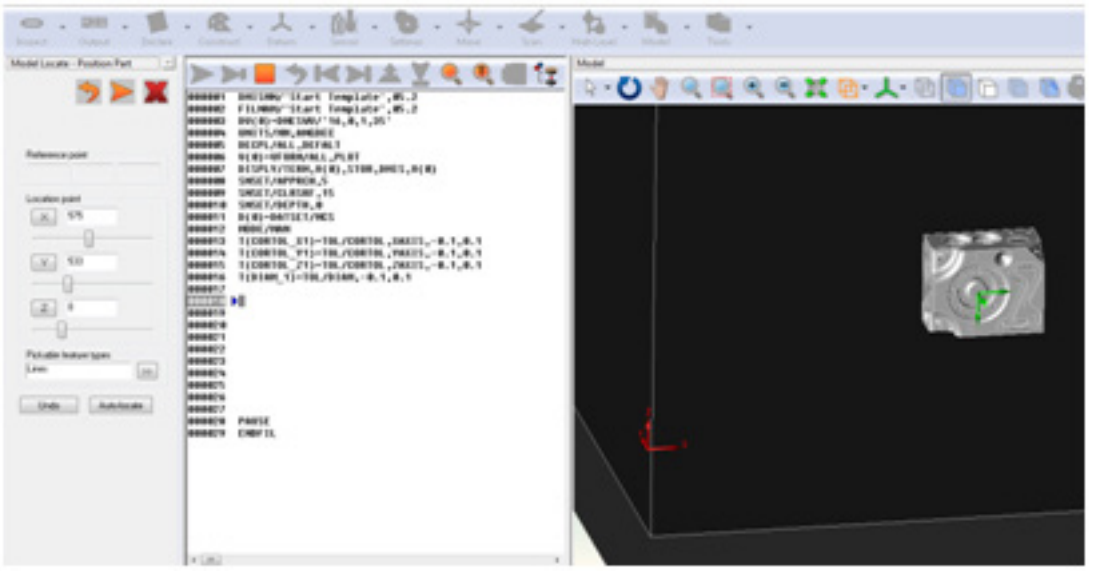
In the example below we have picked two circles and used the centre of the feature in the 'Pickable Actions' dialogue, the software has automatically constructed a line between them to be used for orientation to the X+ of the machine coordinate system. These circles must lie on the same face or an unwanted rotation will occur.



Click on the play icon to continue to the next stage.

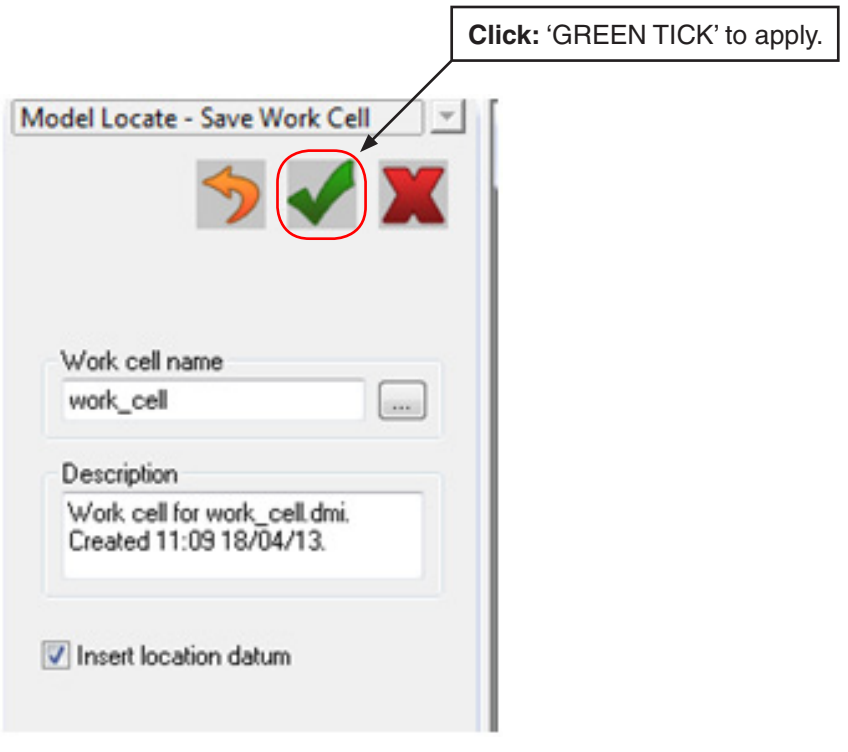
At this point you can visually position your model in the machine volume by using the slider rail. Alternatively, you can enter the X, Y and Z coordinates or select the 'Auto Locate' button.

Click on the play icon to continue to the next stage.

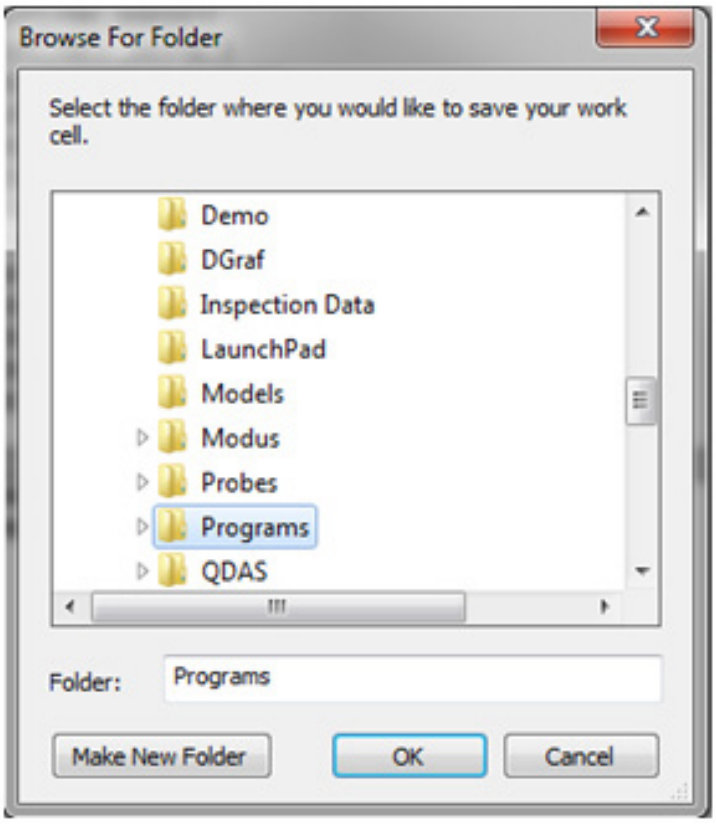


The created work cell can now be saved. At this point the work cell name can be edited.

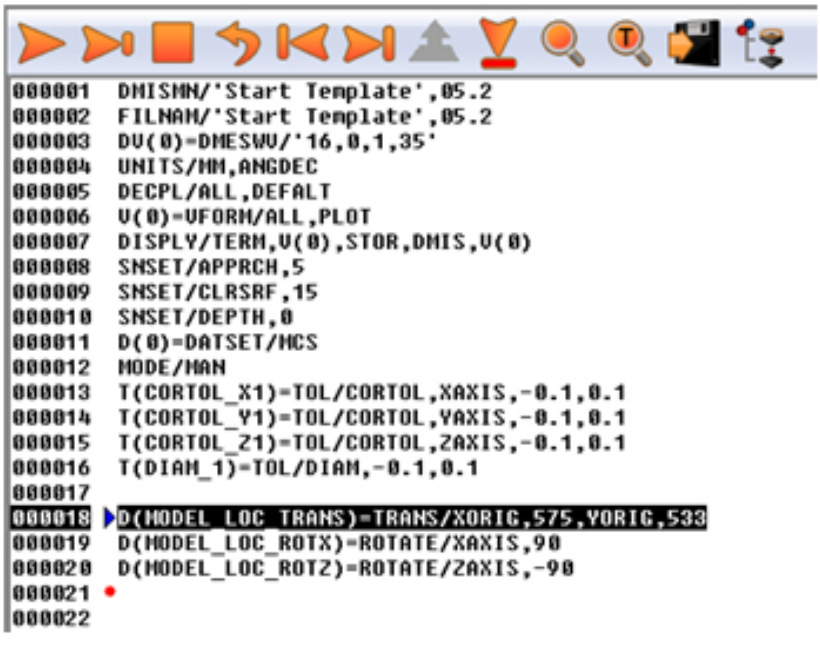
It is imperative that the 'Insert Location Datum' box is left checked (by default) so that the DMIS code is written into the program.



Browse to the file location you wish to save the work cell in.

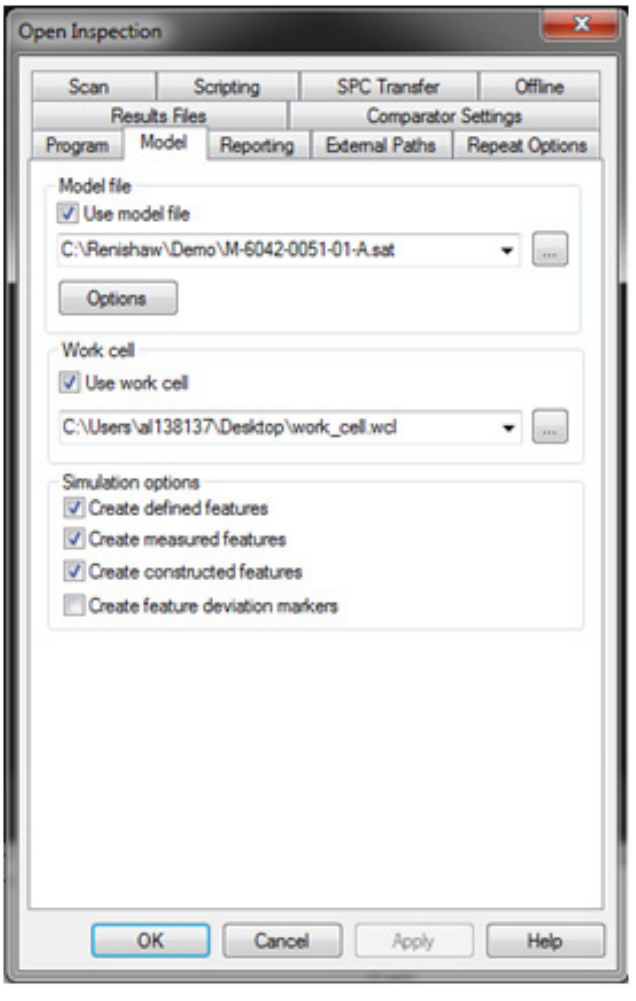


Your work cell DMIS code has now been entered into your DMIS program.



```
000001  DMISMN/'Start Template',05.2
000002  FILNAM/'Start Template',05.2
000003  DU(0)=DMESWU/'16,0,1,35'
000004  UNITS/MM,ANGDEC
000005  DECPL/ALL,DEFALT
000006  V(0)=VFORM/ALL,PLOT
000007  DISPLY/TERM,V(0),STOR,DMIS,V(0)
000008  SNSET/APPRCH,5
000009  SNSET/CLRSRF,15
000010  SNSET/DEPTH,0
000011  D(0)=DATSET/MCS
000012  MODE/MAN
000013  T(CORTOL_X1)=TOL/CORTOL,XAXIS,-0.1,0.1
000014  T(CORTOL_Y1)=TOL/CORTOL,YAXIS,-0.1,0.1
000015  T(CORTOL_Z1)=TOL/CORTOL,ZAXIS,-0.1,0.1
000016  T(DIAM_1)=TOL/DIAM,-0.1,0.1
000017
000018  D(MODEL_LOC_TRANS)=TRANS/XORIG,575,YORIG,533
000019  D(MODEL_LOC_ROTX)=ROTATE/XAXIS,90
000020  D(MODEL_LOC_ROTZ)=ROTATE/ZAXIS,-90
000021
000022
```

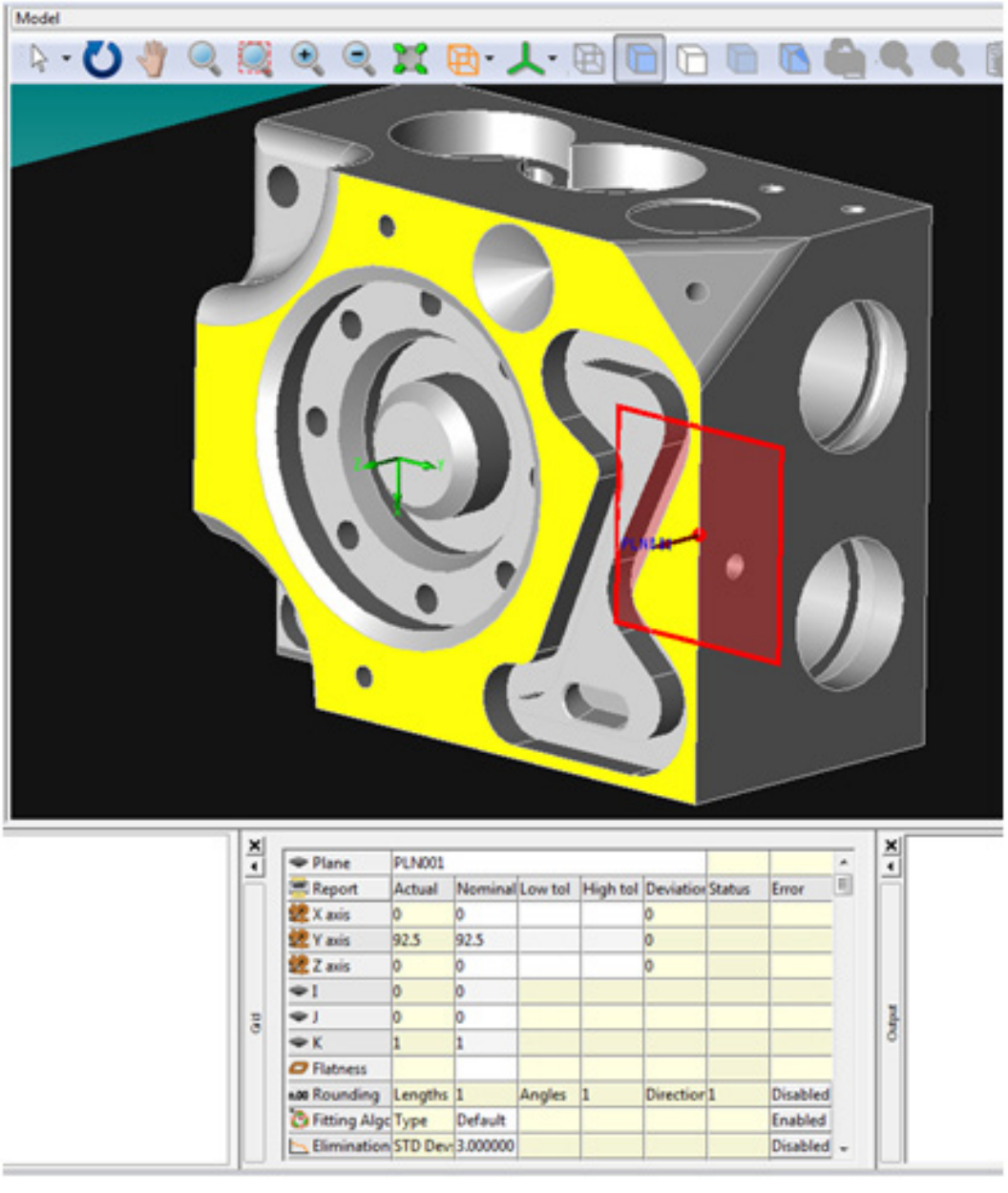
When opening the program you can now see that the previously created work cell has been automatically associated to the program (this is for CAD model import only and can be deselected when CAD model is no longer required i.e. program is production ready).



After locating your work cell it is good practice to carry out a ‘sanity’ check of your part coordinate system.

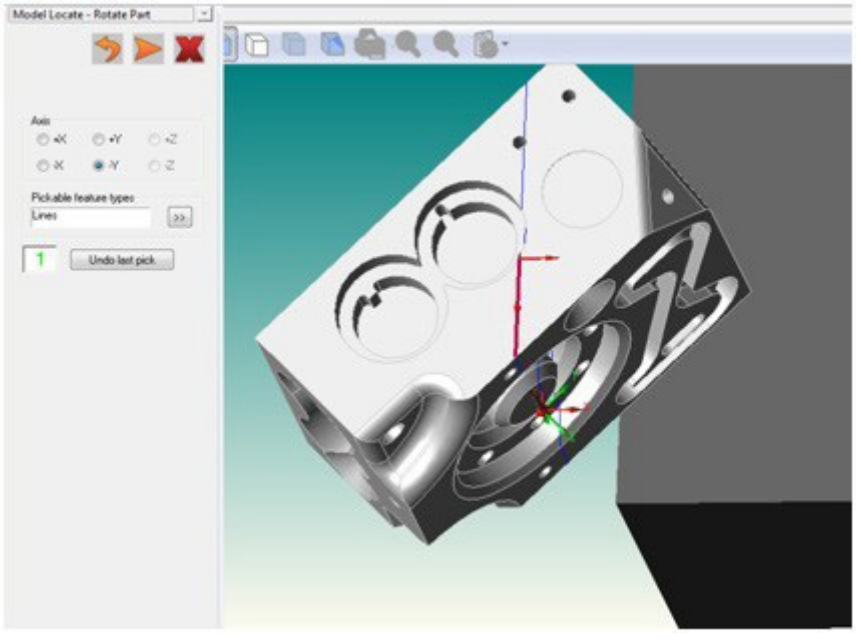
Simply pick on a plane and confirm in the grid window that the vector of the plane is in the part coordinate system and not the machine coordinate system.

In this instance the (Z value, k vector = 1).



A third option is available. When there are no pickable features to align the part in the required orientation, you can rotate your coordinate system to the required angle of orientation. Next select ‘Add Slice’ via the ‘Model’ menu and use the created slice as a pickable feature for orientation.

The example below shows the selected slice used to orientate the model to the Y- of the machine coordinate system.



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